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1430570

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(19)

(54) THROW AWAY TIP TOOL HOLDERS AND TIPS THEREFOR

(71) We, ALFRED HERBERT LIMITED, a British Company of Edgwick Works, Coventry, England, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to throw-away tip tool holders and tips therefore. The invention is of particular utility in so-called form tools for lathes by means of which a complex profile can be cut on a workpiece by a single tool having a cutting edge complementary to the required profile.

According to one aspect of the invention there is provided a cutting tool comprising the combination of a tool holder and a throw-away cutting tip of lamina configuration, said cutting tip having a cutting edge portion and an oppositely disposed rectilinear locating edge portion incorporating a projection of constant width forming a tenon, and said tool holder having a seating face against which one face of the tip is engaged, a shoulder against which the locating edge portion of the tip is located said shoulder having a tenon slot complementary to the projection on the tip and engaged therewith and clamping means urging the tip against the said face and shoulder.

The invention also resides in a throwaway tip for incorporation in a tool as above defined the tip being of lamina configuration having a cutting edge portion and an oppositely disposed rectilinear locating edge portion incorporating a projection of constant width forming a tenon.

The invention further resides in a toolholder for use in a tool as above defined, said tool holder having a seating face against which a tip is to be seated, a locating shoulder formed with a tenon slot for engagement with a complimentarily shaped constant width projection on the tip and clamping means for urging the tip towards said face and said shoulder.

In the accompanying drawings:—

Figure 1 is an exploded view of one example of a tool in accordance with the invention;

Figure 2 is a side view showing the tool assembled;

Figure 3 is a plan of the tool;

Figure 4 is an end elevation of the tool;

Figure 5 is a fragmentary section on line 5—5 in Figure 2; and

Figure 6 is a fragmentary plan showing a modified form of the invention.

Referring firstly to Figures 1 to 5 the tool shown comprises a throwaway tip 10 and a toolholder therefore. The tip 10 is of lamina configuration being formed from a flat wafer of a suitable hard material such as tungsten carbide, a cermet or high speed steel. One edge 10a of the wafer is formed to a configuration which is complimentary to the profile which it is required to form with the tool and defines a cutting edge of the tip. It will be noted that this cutting edge is relieved at a small angle so as in use to give the required clearance. The opposite edge 10b of the tip forms a locating edge for the tip and includes a projecting portion 10c. This portion 10c, is, in fact, of constant width and forms, in effect, a tenon.

Tips as described above can be manufactured in bulk by clamping together a plurality of wafers in a stack and grinding the edges 10a and 10b of all the wafers in the stack simultaneously. Thus the locating edges 10b could be formed by one operation and these edges could then be used to locate the wafers whilst the cutting edges 10a were being formed. In each case the grinding head would be fed along a path inclinded to the planes of the wafers at the required clearance angle.

The tool holder includes a body 11 on which there is formed a face 12 on which a seat member 13 is mounted. This seat member 13 is secured to the body by a screw 14 engaged in a tapped bore 15 in the body. The seat member 13 has a seating face 16 which overhangs a further face 17 on the body which is spaced from and inclined at a small angle to the seating face 16. The face 12 terminates at one edge in a shoulder 18 and is formed

across its width with a tenon slot 19 dimensioned to receive the tenon 10c of the tip and also to receive a tenon 20 provided on the seat member 13.

For clamping the tip against the seating face 16 and the shoulder 18, there is provided a wedge member 21 which has a face 22 resting on the face 17 and a face 23 inclined to the face 22 at an angle equal to the angle between the face 17 and the seating face 16. A screw member 24 with screw threads of opposite hands at its two ends engages a complimentarily tapped bores 25, 26 in the body 11 and the wedge member 21 respectively so that turning of the screw member 24 by means of a tool inserted into a socket in one edge of the member 21 displaces the latter along the face 17. To prevent lateral displacement of the wedge member 21, it is provided on the face 23 thereof with a rib 27 along which the bore 26 is formed. This rib 27 fits in a complimentary groove 28 in the face 17.

It will be seen that the position of the tip 10 on the body 11 is determined entirely by the seating face 16, the shoulder 18 and the tenon slot 19. The shoulder 18 accepts, in use, the load caused by radial feeding of the tool onto a rotating workpiece and any axial load which may arise as a result of any asymmetry of the cutting edge is borne by the tenon groove 19.

In the modification of the invention shown in Figure 6 the seating member 29 has an edge 29a which is the same shape as the cutting edge 10a of the tip so that the tip is supported at a constant small distance from the cutting edge. This is of interest when the profile to be cut is a deep one, where the simpler form of seating member 13 may give insufficient support to the tip, resulting in chatter.

WHAT WE CLAIM IS:—

1. A cutting tool comprising the combination of a tool holder and a throwaway cutting tip of lamina configuration, said cutting tip having a cutting edge portion and an oppositely disposed rectilinear locating edge portion incorporating a projection of constant width forming a tenon and said tool holder having a seating face against which one face of the tip is engaged, a shoulder against which the locating edge portion of the tip is located said shoulder having a tenon slot complementary to the projection on the tip and engaged therewith and clamping means urging the tip against the said face and said shoulder.

2. A tool as claimed in Claim 1 in which said clamping means comprises a wedge member engaged with a further face of the holder which is inclined to said seating face at an acute angle and movable in a direction parallel to said further face and normal to said shoulder; said wedge member having a tip engaging face parallel to the seating face, and means for displacing the wedge member in said direction.

3. A tool as claimed in either preceding claim in which the tip has a non-linear cutting edge portion.

4. A tool as claimed in Claim 3 in which the clamping means has an edge shaped similarly to the cutting edge portion so as to provide support adjacent the cutting edge portion.

5. A tool as claimed in Claim 3 or Claim 4 in which the seating face has an edge shaped similarly to the cutting edge portion so as to provide support adjacent the cutting edge portion.

6. A tool as claimed in any of the preceding claims in which the seating face is provided on a separate seat member attached to the body.

7. A tool as claimed in Claim 6 in which the seat member has a recess or projection to coact with the projection or recess in said shoulder for locating the seat member accurately on the body.

8. A tool substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

9. A throw-away tip for incorporation in a tool as claimed in Claim 1, the tip being of a lamina configuration having a cutting edge portion and an oppositely disposed rectilinear locating edge portion incorporating a projection of constant width forming a tenon.

10. A throwaway tip as claimed in Claim 9 in which the cutting edge portion is non-linear.

11. A throwaway tip as claimed in Claim 9 or Claim 10 in which the cutting edge portion is relieved at a small angle.

12. A throwaway tip substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

13. A method of manufacturing lamina configuration throwaway tips as claimed in Claim 9 in which said locating edge portion is formed first, and using the projection thereon to locate the tip whilst the cutting edge portion is formed by grinding utilizing a grinding head fed along a path inclined to the plane of the lamina.

14. A method as claimed in Claim 13 in which are plurality of the tips are stacked and the cutting edges of all are ground simultaneously.

15. A toolholder for use in a tool as claimed in Claim 1, said tool holder having a seating face against which a tip is to be seated, a locating shoulder formed with a tenon slot for engagement with a complimentarily shaped constant width projection on the tip and clamping means for urging the tip towards said face and said shoulder.

16. A toolholder as claimed in Claim 15 in which said clamping means comprises a wedge member engaged with a further face of the body which is inclined to said seating face at an acute angle and moveable in a direction

parallel to said further face and normal to said shoulder; said wedge member having a tip engaging face parallel to the seating face, and means for displacing the wedge member in said direction.

17. A toolholder as claimed in Claim 15 or 16 in which said seat face is provided on a separate seat member attached to the body.

18. A toolholder as claimed in Claim 17 in which the seat member has a recess or projection to coact with the projection or recess in said shoulder for locating the seat member accurately on the body.

19. A toolholder substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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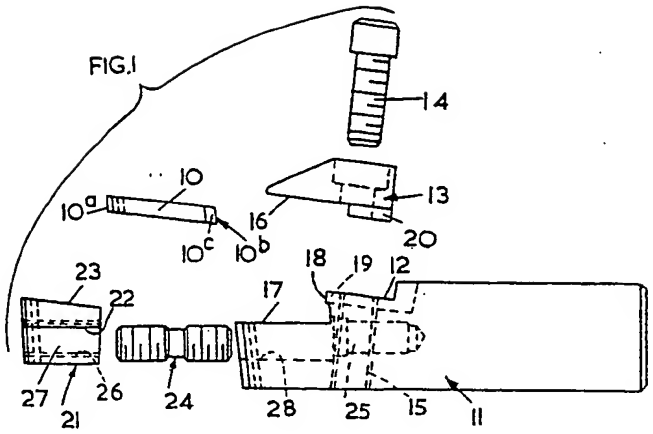
1430570 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1



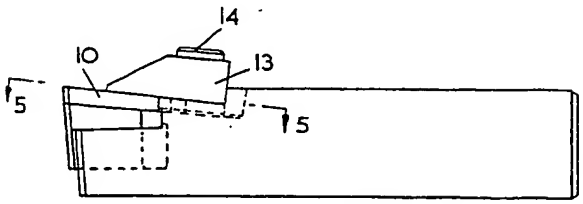


FIG.2

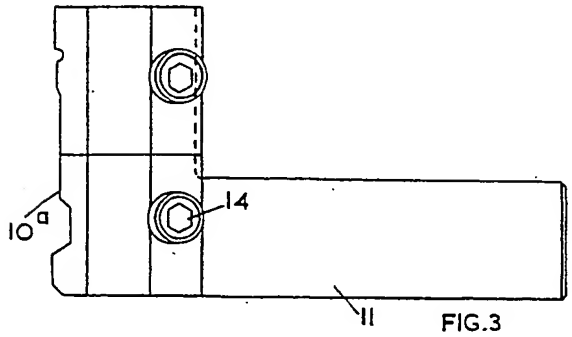


FIG.3

1430570 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

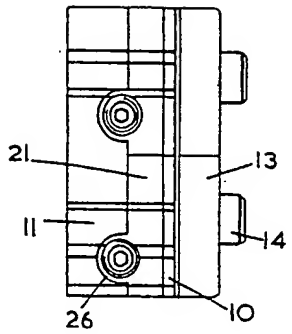


FIG.4

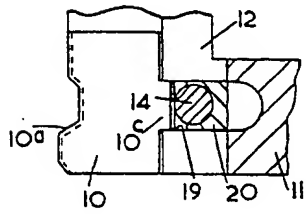


FIG.5

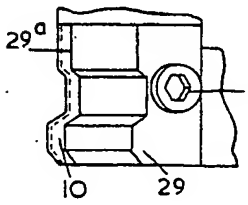


FIG.6